



Department of Education
Office of Financial Student Aid

Rational Tool Implementation Support Team
Architecture Implementation Plan –
ClearCase as an ITA Service

DRAFT

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1. INTRODUCTION

1.1 Purpose and Scope

This draft provides a high-level definition of and an implementation plan for ClearCase as an Integrated Technical Architecture (ITA) service. The purpose of this draft is to articulate the vision, solicit feedback, and coordinate the initial FSA and Accenture planning and approval resources. This draft will also serve as the primary input to the final planning phase that will include the FSA, Accenture, and the Virtual Data Center (VDC) resources required to effectively implement a ClearCase architecture for FSA.

Implementing ClearCase as an ITA service can be divided into four phases –

1. Developing a plan and obtaining concurrence.
This phase includes producing this draft plan, obtaining approval to proceed, producing a final plan, and obtaining concurrence with the final plan by the stakeholders.
2. Implementing the architectural components.
This phase includes installing and configuring ClearCase on the individual ITA hosts, ensuring that all components have the connectivity to function correctly, and optionally enabling the integration of ClearCase with the various ITA tools.
3. Migrating the projects onto the architecture.
This phase includes project specific Configuration Management and ClearCase process and procedure development, project specific scheduling and risk management, project specific CM support activities, domain account administration, and the procedural integration of ClearCase with the various ITA tools.
4. Sustaining ClearCase and CM services to individual projects.
This phase includes providing and maintaining the processes, procedures, and environments for concurrent parallel development version control and baseline management.

The scope of this document is limited to planning for the implementation of the ClearCase architectural components. Other related Configuration Management (CM), ClearCase, and administrative topics are addressed only to provide context for implementing the architectural components.

Implementing the architectural components of ClearCase requires the installation of various ClearCase components on the FSA development and test hosts. This non-trivial task will span a several months and require resources from FSA, Rational Tool Support Team (RTS), ITA, and VDC admins. For FSA, many of the development and test hosts are located on, the VDC/ITA development and test environment, the Accenture Department of Education network (ACDOE), and the Department of Education network (EDNet).

Migrating FSA project teams to the ITA ClearCase environment (or any ClearCase environment) is very project specific and requires close coordination with each individual project to implement detailed CM and ClearCase procedures. The procedures implement generic CM and ClearCase “best practices” and are fairly consistent across projects. However, each project has unique challenges with adapting to these practices and procedures. Typically, the RTS provides significant training and mentoring for several months during project migrations. This includes training and mentoring a project specific CM/ClearCase administrator.

Sustaining ClearCase and CM services to individual projects can be characterized as providing the day to day support for code repositories, version control, baseline management, controlled build and test environments, CM and ClearCase training, and CM and ClearCase administration.

1.2 Business Case

FSA is implementing a significant modernization program to help drive cost reductions and improve quality. This program includes adopting modern software engineering practices for the development and procurement of software intensive systems.

The FSA ITA has demonstrated the cost effectiveness of standardization and consolidation on specific engineering tools and techniques through the implementation of the ITA environment and services at the VDC. The ITA environment is the standard development and test environment for FSA.

Modern configuration management (CM) techniques, enabled by ClearCase, have been successfully demonstrated on several individual FSA projects. FSA can standardize and consolidate CM techniques and ClearCase support by implementing ClearCase as an ITA service. This standard environment will facilitate the development, testing, and deployment of FSA systems at the VDC.

1.3 Existing FSA ClearCase Environment

Currently, operational ClearCase services at the VDC are implemented on a handful of VDC UNIX development and test hosts, including several ITA hosts. There is also a very limited ClearCase web (intranet) capability. In addition to the VDC ClearCase environment, there is also a limited operational implementation of ClearCase services for ACDOE hosted Windows hosts. The VDC and ACDOE ClearCase environment are mutually exclusive and they are not at all integrated. The ITA ClearCase environment will not be integrated with the existing ACDOE ClearCase environment. The ACDOE ClearCase environment should be phased out. Appendix A provides a diagram of the existing FSA ClearCase environments.

2. DEFINITION of ClearCase as an ITA service

The existing ITA development and test environment at the VDC consists of about 16 UNIX hosts and several NT hosts. The ITA uses these hosts to provide various development, testing, and deployment services to FSA project development teams.

The definition of ClearCase as an ITA service is -

1. Provide full (complete UNIX and NT ClearCase functionality) ClearCase services on most ITA hosts at the VDC
2. Provide an ITA, VDC hosted, ClearCase web server to extend some services beyond the VDC/ITA environment to the ACDOE and EDNet desktops
3. Provide full ClearCase services to non-ITA VDC development and test hosts
4. Provide ClearCase/CM process and procedure mentoring and development
5. Provide ClearCase training
6. Provide ongoing ClearCase administration and maintenance

Appendix B provides a diagram of the proposed ClearCase architecture.

3. HIGH LEVEL APPROACH

The high-level approach to implementing ClearCase as an ITA service follows. These high-level steps map directly to the steps in Section 5, the Detailed Approach, later in this document. More information about each of these high-level steps can be found there.

1. Obtain ITA high-level understanding and concurrence of scope and breadth of “ClearCase as an ITA service”. Provide high-level understanding of issues and support requirements. Obtain initial ITA engineering support for ClearCase architecture implementation.
2. Obtain stakeholder (see definition below) understanding and concurrence of scope and breadth of “ClearCase as an ITA service”. Provide high-level understanding of issues and support requirements.
3. Obtain stakeholder understanding and concurrence of planned ClearCase server availability and access.
4. Obtain stakeholder understanding and concurrence of required account management processes.
5. Obtain stakeholder understanding and concurrence of not implementing MultiSite.
6. Obtain stakeholder understanding and concurrence of CM process and ClearCase tool training requirements.
7. Implement a highly available and accessible VOB (ClearCase code repository), view, web, license, and registry server.
8. Prepare platform specific ClearCase release areas for HP-UX, AIX, and NT/W2K.
9. Create ClearCase admin accounts on all hosts.
10. Install ClearCase client on UNIX hosts.
11. Install ClearCase client on NT hosts and configure for interoperability with ClearCase UNIX servers.
12. Create user accounts.
13. Move ClearCase license server to a designated ITA ClearCase license server.
14. Migrate projects to the ITA ClearCase environment.
15. Sustaining engineering.
16. Continual improvement.

3.1 High-level Schedule

Step	Duration	Start	End
1. Obtain ITA high-level understanding and concurrence of scope and breadth of “ClearCase as an ITA service”. Provide high-level understanding of issues and support requirements. Obtain initial ITA engineering support for ClearCase architecture implementation.	45	3/1/03	4/15/03
2. Obtain stakeholder (see definition below) understanding and concurrence of scope and breadth of “ClearCase as an ITA service”. Provide high-level understanding of issues and support requirements.	15	4/15/03	4/30/03
3. Obtain stakeholder understanding and concurrence of planned ClearCase server availability and access.	15	4/15/03	4/30/03
4. Obtain stakeholder understanding and concurrence of required account management processes.	15	4/15/03	4/30/03
5. Obtain stakeholder understanding and concurrence of CM process and ClearCase tool training requirements.	15	4/15/03	4/30/03
6. Obtain stakeholder understanding and concurrence of not implementing MultiSite.	15	4/15/03	4/30/03
7. Implement a highly available and accessible VOB, view, web, license, and registry server.	TBD	4/30/03	TBD
8. Prepare platform specific ClearCase release areas for HP-UX, AIX, and NT/W2K.	15	4/30/03	5/15/03
9. Create ClearCase admin accounts on all hosts.	15	4/30/03	5/15/03
10. Install ClearCase client on UNIX hosts.	7	5/15/03	5/22/03
11. Install ClearCase client on NT hosts and configure interoperations.	15	5/30/03	6/15/03
12. Create user accounts.		5/15/03	9/30/03
13. Move ClearCase license server.	45	4/15/03	5/30/03
14. Migrate projects to the environment.		5/30/03	9/30/03
15. Sustaining engineering.		5/30/03	9/30/03
16. Continual Improvement.		5/30/03	9/30/03

4. ROLES

Lorenzo Moore	FSA ClearCase Architecture Implementation Manager
Ron Langkamp	Accenture Rational Tool Support Team Manager
Paul Capotosto	Accenture ClearCase Architecture Implementation Technical Manager
Jack Gillotti	VDC Rational Tool Service Delivery Manager
TBD	VDC UNIX Service Delivery Manager
Larry Hale	VDC NT Service Delivery Manager
Becky Panetta	VDC ClearCase Admin
TBD	VDC user account management
TBD	VDC UNIX System Administrator
TBD	VDCNT System Administrator
Alex Lefur	ITA Management and Engineering Support
TBD	ITA WebSphere and IHS support
TBD	Other

4.1 Stakeholders

FSA	IT Services, EDCap, Lorenzo Moore, Security Auditors
VDC	Rational SDM, Jack Gillotti, Becky Panetta, Chuck Biddiscomb, NT SDM, Larry Hale, UNIX SDM, NT and UNIX Account Admins, Firewall Admins
ITA	Alex Lefur, Suneel Bharagava
RTS	Ron Langkamp, Paul Capotosto
EAI	Patrick Volpe, Bon Ku
Other	TBD

5. DETAILED APPROACH

This section provides details on each of the sixteen steps identified in Section 3, the High Level Approach. The detailed approach to implementing the ClearCase architecture follows. These steps map to the previous high-level approach steps. Detailed installation procedures are provided in the vendor documentation and are beyond the scope of this document.

5.1 ITA Concurrence

1. Obtain ITA high-level understanding and concurrence of scope and breadth of “ClearCase as an ITA service”. Provide high-level understanding of issues and support requirements. Obtain initial ITA management and engineering support for ClearCase architecture implementation, including ITA tool admin support. Obtain initial ITA management and engineering concurrence and support for the entire implementation plan. Obtain ITA commitment for active participation in the implementation plan development and execution.

5.2 Implementation Concurrence

2. Obtain stakeholder understanding and concurrence of scope and breadth of “ClearCase as an ITA service”. Provide high-level understanding of issues and support requirements. Obtain initial stakeholder management and engineering support for ClearCase architecture implementation. Obtain initial stakeholder management and engineering concurrence and support for the entire implementation plan. Obtain stakeholder commitment for active participation in the implementation plan development and execution. This includes concurrence with;
 - a the distinct “plan, architecture, migration, maintenance” phased approach
 - b the proposed architecture
 - c the eventual phase out of ACDOE ClearCase
 - d the project migration planning and implementation support and requirements
 - e the maintenance planning and implementation support and requirements
 - f the training, mentoring, and knowledge transfer support requirements
 - g the account management, including NT/UNIX interop, support requirements
 - h the system administration and change request support requirements

5.3 ClearCase Server Concurrence

3. Obtain stakeholder understanding and concurrence of planned ClearCase server availability and access.

The architecture proposed in this plan includes su35e16 and su35e17 as the ClearCase VOB and view servers, respectively (refer to appendix B). These hosts were previously implemented as ClearCase servers for the EAI project. Initial capacity estimates indicate

that these hosts could support all of FSA's VDC ClearCase server requirements. However, the primary purpose of these hosts is support for EAI development and test.

There may be occasions when EAI support interferes with ClearCase support. If these hosts become unavailable for ClearCase, even momentarily, All ClearCase operations will stop for the duration of the server failures. Since most or all FSA development will rely on the availability of these hosts, outages will have a very serious negative affect on FSA development activities. This prospect should be analyzed and the risks should be very well understood.

One approach to ensuring that all development activities will not come to complete stop, is to put some basic process and scripting in place, that will provide write access to fairly recent copies of their development files, but without version control. However, at best, this will still have a significant negative affect on project schedules.

We should consider obtaining and implementing dedicated ClearCase servers. Further, a real time fail-over strategy could ensure about 99% availability. An initial cost benefit and risk analysis of dedicated servers with fail over should be performed.

Regardless of the chosen server architecture, processes for very rapid response to potential ClearCase server failures must be developed and validated.

5.4 Account Management

4. Obtain stakeholder understanding and concurrence of required account management processes.

Refer to the consistent account management white paper in the Appendix C.

Note that NT interop hosts (NT hosts that are ClearCase clients of a UNIX ClearCase VOB server) require consistent NT domain account names and groups that are consistent with the NIS map. Obtain concurrence from NT domain admins that their admin process does, and will continue to, support this.

Account managers should develop and distribute a written process for ensuring consistent accounts. Existing users on proposed hosts have files with existing, non-consistent, owners/groups. The plan should include process for dealing with existing files. The process should include maintaining and publishing a contemporaneous account status report. This report will provide status for each account/group creation, modification, or deletion request.

5.5 MultiSite not implemented

5. Obtain stakeholder understanding and concurrence on not using MultiSite
ClearCase MultiSite is another Rational product that can be layered on top of ClearCase to provide remote VOB (code repository) synchronization. Typically this is used to synchronize code development activities between geographically remote sites. However, it can also be used to synchronize development activities at a single site with environments separated by firewalls. For FSA, the EDNet, the ACDOE, any outsourced development site, VDC dev and test, and VDC production could be considered as remote sites in the MultiSite paradigm.

A ClearCase MultiSite implementation consists of a full ClearCase client/server implementation at each site. In addition, MultiSite is also implemented at each site to provide the functionality to keep the ClearCase servers at each site synchronized. This plan assumes that the resources required to implement and maintain a MultiSite architecture will not be available to FSA. Consequently, this plan proposes a leaner architecture of a single ClearCase client/server implementation with intranet web capability.

5.6 Implement ClearCase Architecture

6. Implement a highly available and accessible VOB, view, web, license, and registry server.

Refer to the above availability concurrence step.

Refer to the architecture diagrams in the appendix B for illustration.

VOB, view, registry, and license servers –

Currently su35e16 is the VOB and registry server, su35e17 is the view server, and the NT host named rational is the license server. The license server will/should be moved to the VOB server.

We could and should proceed with the implementation plan with these servers and work through the associated risks. If it is determined to implement other hosts as the servers, they can be retrofitted into the proposed architecture with appropriate planning and administration.

A failover capability could be implemented so that in the event that one server fails, the other server immediately provides all support. There would be performance degradation but not outages. If both servers failed there would be outages.

Web Server –

Implementing a ClearCase intRAnet web server, would provide limited ClearCase functions to development desktops on the EDNet and ACDOE LANs. InterNet access will not be provided. With the ClearCase web server and appropriate processes, FSA

developers with have a consistent version control environment across the domains. That is, the same file versions and baselines would be available on ACDOE, EDNet, and the VDC development and test hosts. The file transfers and mounting is transparent to the developers.

A ClearCase web server on an ITA IHS host (su35e2) has been prototyped with the existing VDC ClearCase UNIX environment. The prototype did exhibit some performance and reliability issues that have not been analyzed. A more robust version will have to be implemented. ITA/IHS admin support will be required to ensure successful implementation. The server must have about 2MB of storage per user.

7. Prepare platform specific ClearCase release areas for HP-UX, AIX, and NT/W2K.

This detailed ClearCase installation step is included here to ensure appropriate admin support. This step requires root permission and should be performed by an experienced ClearCase admin. In the past, a VDC admin with ClearCase experience has successfully performed this task for other platforms. We should repeat that success if possible. The point here is that we should not expect a non-ClearCase experienced system admin to perform ClearCase administration remotely from the ClearCase administrator. Instead, the ClearCase admin should be granted root permission as needed to perform ClearCase admin tasks or and admin (with root permission) with significant ClearCase experience should perform the work. That being said, non-ClearCase system admin support is often required to prepare a host for ClearCase installation. Probably the best approach here is to have the ClearCase admin walk through the ClearCase evaluation, installation, and configuration with the system admin to provide the system admin with some context. The system admin can monitor all ClearCase admin activity on the host. The ClearCase admin would need Remote Control Option (RCO) access to the host. We have successfully used this approach at the VDC. We should repeat that success.

8. Create ClearCase admin accounts on designated hosts.

Refer to the account management white paper in the appendix C. These accounts need to be created very early in the implementation schedule. The ClearCase admins will submit the standard FSA account requests. Note that about 30 requests for each of about 2 admins is a plausible estimate. This process should be reviewed to determine if there is a more efficient alternative.

9. Install ClearCase client on UNIX hosts.

Refer to the ClearCase install template in the appendix E for some context of the details of this step. This detailed ClearCase installation step is included here to ensure appropriate admin support. This step requires root permission and should be performed by an experienced ClearCase admin. In the past, a VDC admin with ClearCase experience has successfully performed this task for other platforms. We should repeat that success if possible. The point here is that we should not expect a non-ClearCase experienced system admin to perform ClearCase administration remotely from the

ClearCase administrator. Instead, the ClearCase admin should be granted root permission as needed to perform ClearCase admin tasks or an admin (with root permission) with significant ClearCase experience should perform the work. That being said, non-ClearCase system admin support is often required to prepare a host for ClearCase installation. Probably the best approach here is to have the ClearCase admin walk through the ClearCase evaluation, installation, and configuration with the system admin to provide the system admin with some context. The system admin can monitor all ClearCase admin activity on the host. The ClearCase admin would need RCO access to the host. We have successfully used this approach at the VDC. We should repeat that success.

ClearCase admin account management as noted above is required for this step

10. Install ClearCase client on NT hosts and configure interop.

This detailed ClearCase installation step is included here to ensure appropriate admin support. This step requires administrator permission and should be performed by an experienced ClearCase admin. The point here is that we should not expect a non-ClearCase experienced system admin to perform ClearCase administration remotely from the ClearCase administrator. Instead, the ClearCase admin should be granted administrator permission as needed to perform ClearCase admin tasks or an admin (with administrator permission) with significant ClearCase experience should perform the work. That being said, non-ClearCase system admin support is often required to prepare a host for ClearCase installation. Probably the best approach here is to have the ClearCase admin walk through the ClearCase evaluation, installation, and configuration with the system admin to provide the system admin with some context. The system admin can monitor all ClearCase admin activity on the host. The ClearCase admin would need RCO access to the host. We have successfully used this approach at the VDC. We should repeat that success. Ensure that we have NT admin management (NT SDM) concurrence.

This step does require some initial NT account creation. Note that account consistency with the NIS map is case sensitive. All NT ClearCase hosts must be in a domain. It is presumed, but should be validated that the NT hosts are in a domain.

In addition to installing ClearCase client for NT, an NFS client (ie. Maestro) must be installed and configured on each NT host. The NFS client must be acquired and configuration parameters determined and documented.

11. Create user accounts

For each of the hosts in the host table in appendix D, create user accounts as needed. Note that these are not ClearCase specific accounts, they are UNIX and NT accounts. Refer to the account management white paper in the appendix E. As groups of users, either new or existing, migrate to ClearCase, the users will submit the standard FSA account requests. There could be many request submissions per user. Note also that

there is an associated task of converting ownership/group for existing user files. Also, some development and test tools may require specific accounts.

12. Move ClearCase license server

For improved reliability, the ClearCase license and VOB server should be the same host. Currently, the ClearCase licenses are served by a VDC hosted NT box. These licenses should be moved to the proposed VOB server, currently su35e16. Since all existing and new ClearCase hosts must be able to connect to the license server, we should initially move some licenses and validate connectivity. A license server setting parameter value must be set on each individual ClearCase host. Also, firewalls must be configured to allow port 371 between the license server and the hosts. Some existing ClearCase hosts are on the ACDOE.

13. Validate architecture as implemented

Most of the detailed ClearCase for FSA architectural complexities have already been resolved and validated with prototypes and initial, single project implementations.

Basic ClearCase connectivity and functional routines will be executed on each host to validate this implementation. A short validation suite with test data will be developed.

In addition to the basic ClearCase testing, VOB backup (BU) and restore process must be validated. BU/restore validation is time intensive and requires coordinating VOB admin account creation, interfacing with the existing VDC BU/restore routines, and ClearCase VOB restore procedures. Each VOB BU/restore must be validated individually after the VOB is created. Refer to the VOB backup and restore section for details.

5.7 Migrate Projects

14. Migrate projects to the environment

Migrating the first project to the environment begins after the architecture is built and validated. Many of the processes for migrating FSA projects to, and maintaining them on, a FSA ClearCase environment have been developed and validated with prototypes and initial, project based, ClearCase implementations. These processes should be enhanced and re-worked into formal job aides for ClearCase as an ITA service. The details of project migration are beyond the scope of this document and will be provided in separate documents. Even though the overall project migration process is similar and some steps are identical from project to project, migrating a project to any CM environment still requires extensive planning and execution at the project level.

Training Summary –

Adequate CM and ClearCase user and admin training, as well as expertise and mentoring are critical components to the successful adoption of ClearCase. This is such a critical

component to success that at least a high-level notification and acknowledgement of this risk should be presented here. Adequate ClearCase user training plans need to be developed and executed. Note that 16 class/lab hours of ClearCase user training typically the minimum. ClearCase admin training requires another 24 hours of class/lab. Refer to appendix F for more details on ClearCase training.

ITA project early to migrate -

Consider migrating the ITA developers to the environment as one of the first projects. This will develop a core user knowledge base within ITA. ITA provides development services as components to various projects. Once ITA has migrated to the new environment, the existing ACDOE ClearCase environment can be decommissioned.

ClearCase integration with ITA development and test tools –

Several ITA development and test tools are identified in the table in appendix D. Effective use of ClearCase at FSA does not require specific integration with these tools. However, for improved efficiencies, ClearCase can be integrated with many development and test tools on both a control and a procedural levels. Integrating these tools can begin with the architecture implementation and will probably continue through the maintenance phase. Individual tool administration expertise will be required to complete these integrations. Each tool will have to be evaluated to determine if integration is possible or worthwhile.

Many tools support control level integration through a standardized API. These types of integrations are relatively straight forward for ClearCase hosts, that is, hosts on which both the tool and ClearCase are installed. Using WebSphere Development Studio as an example, once integrated at the control level, full ClearCase menu drop downs are available from within WebSphere. Note that desktops on the EDNet and ACDOE will NOT have ClearCase installed. Their interface to ClearCase is through a web browser.

Most tools will likely be integrated with ClearCase at a procedural level. That is, the CM processes and procedures that ClearCase automates will be applied to the tool usage. For tools that allow path selection to tool artifacts (files), paths to ClearCase controlled repositories will be used within the tool. For tools that maintain artifacts in a proprietary repository, it is expected that periodic exports and imports between the tool and ClearCase will provide adequate version control of the artifacts.

In addition, individual tool architectures will also affect integration with ClearCase. A good example of this is MicroStrategy. At FSA, developers utilize a VDC hosted MicroStrategy NT server with EDNet hosted MicroStrategy clients. Data (code) transfer between the VDC hosted MicroStrategy server and the EDNet hosted MicroStrategy clients is internal to MicroStrategy.

Regardless of the individual tools, applying sound CM principles and procedures to development and test activities will optimize available integration points

5.8 Sustaining Engineering

After the initial implementation, there will be a need to maintain the architecture and to provide project level CM and ClearCase support.

15. Architecture Maintenance

These maintenance tasks are not project specific and will be performed as an ITA service by and ITA admin. The details of this task will be developed during the implementation phase. These maintenance activities include;

- Adding new ClearCase hosts and host types to support projects as needed
- Removing existing ClearCase hosts to support projects as needed
- Modifying existing ClearCase hosts to support projects as need, including; OS upgrades and patches, ClearCase upgrades and patches, administering various daemons, kernel parameters, etc,
- ClearCase Web server administration
- ClearCase performance monitoring, analysis, and tuning
- VOB and view storage maintenance
- Developing and implementing automation scripts and triggers
- ClearCase user and administrator assistance and mentoring to support projects as needed
- UNIX and NT account management to support projects as needed
- ClearCase license monitoring and maintenance
- ClearCase performance tuning
- ClearCase outage response, analysis, and avoidance

16. Project Support

These tasks are project specific and will be performed as an ITA service to a project or by a project CM admin. The details of this task will be developed during the implementation phase. These activities include;

- Identifying configurable items
- Developing project specific CM and ClearCase procedures
- Developing source tree structures and source tree maintenance
- Administering project specific ClearCase metadata
- Designating baselines
- Administering branching and merges
- Performing project build and deploy functions
- Supporting project integration and test efforts

17. Continual Process Improvement

While the maintenance and project support tasks identified above will contribute to continually improving the environment, the activities identified here are focused on enterprise CM and ClearCase processes and improvements. The details of this task will be developed during the implementation phase. Some of these tasks include:

- Leveraging the ClearCase build facility capabilities
- Improving ClearCase/IDE integrations and support IDE upgrades
- Integrating ClearCase and CQ, potentially with UCM
- Integrating ClearCase with Release Management processes
- Integration ClearCase with test processes
- Integration ClearCase with environment management processes
- Using ClearCase to collect measurements.

6. Change Requests

Change Requests (CRs) will be required to implement changes at the VDC. Required CRs will be identified and drafted by the stakeholders during the development and review of the final implementation plan. The CRs may have to be submitted prior to the plan final review. The intent here is to avoid or minimize CR review cycles and schedule hits during the actual implementation. Also, it provides an opportunity for stakeholders to assess and plan for delivering their resource commitment.

7. Other

7.1 Project Task Plan

Appendix G contains a detailed Project Management Plan, in Microsoft Project. The plan contains initial estimates for task dates, durations and assignments. More refined estimates should be provided for the final version of this implementation plan. The Project Management Plan for this implementation is intended for use as guide and is not intended to provide detailed task tracking. Using the Project Management Plan as a guide and following this implementation plan should adequately support the task management of implementing this plan.

7.2 VOB Backup and Restore Validation

The backup and restore process for each individual VOB should be validated prior to relying on the VOB as a source repository. VOBs must be locked in order for the existing backup routines to capture them. Typically, a cron job is implemented to execute a script that locks the VOB just prior to the backup routine and unlocks just after the backup routine completes. Optionally, the script can check output from the backup routine and report an exit status. Both backup and the restore should be tested for each individual VOB, by name, prior to relying upon it as a code repository. It should be noted that VOBs should be owned by a project specific VOB admin account. The VOB account is owned by the project VOB administrator. Usually, the VOB administrator is identified and the accounts are created when a project begins to migrate to ClearCase. However, it is possible to create these accounts for known projects ahead of time during the Architecture Implementation Phase of this plan. Early creation of the accounts and the VOBs will allow timely validation of VOB backup and restore procedures. In this case, a RTS member can own the account and transfer ownership to the eventual project admin at a later date. Examples of this may include ITA and eZAudit.

7.3 Environment Management

Existing environment management plans for the proposed hosts and projects should be identified and reviewed. Documentation that details the existing or planned partitioning of these hosts need to be provided. Identifying specific development and test partitions for each project is critical to developing effective project CM procedures that enable version control and valid test environments.

7.4 ClearCase NT/UNIX interop

This section provides a brief overview of some of the important concepts for ClearCase interoperation between UNIX and Windows for FSA.

ClearCase is built on a client server architecture. For FSA, the ClearCase server(s) will be VDC UNIX hosts and ClearCase client will be both VDC UNIX and VDC Windows hosts. Interoperations between UNIX and Windows for any application must address some fundamental differences between UNIX and Windows such as file sharing protocols, line and file termination sequences, authentication and file protection mechanisms, path names, and domain management techniques.

For file sharing, UNIX uses Network File Sharing (NFS) protocol while Windows uses Server Message Block (SMB) protocol. In order to share files between UNIX and Windows, third party tools are used to map across these two protocols. For our purposes (assuming that there are very few Windows ClearCase clients), we will install and configure a third party NFS client tool (such as Hummingbird's Maestro) on each VDC NT client host. We will also manage account names and groups that are consistent across the Windows and UNIX domains.

We will configure ClearCase to interpret line feed and file terminations, resolve path names, and perform authentication appropriately for UNIX and Windows interoperations.

8. LIMITATIONS CONSTRAINTS

Some known risks and limitations are identified below.

1. This document is an initial draft and will probably be significantly changed after additional ITA review.
2. The ClearCase web server will probably need to be moved to a more robust platform. Analysis of some anomalies identified with the prototype ClearCase web server should be completed. The anomalies include; the generic network validation, performance “hangs”, qualifying functional limitations, and quantifying network load.
3. Determine the long term location for VOB and view server. Understand risks with the current su35e16 and 17 hosts.
4. There is a lead time of several weeks for account creations.
5. It is likely that there are non-ITA hosts at the VDC that are potential ClearCase clients. No specific non-ITA hosts have been identified. Impact analysis of implementing ClearCase on such hosts has not been performed.
6. Existing ClearCase regions will be modified to support this plan.
7. A ClearCase development and test environment is not available for analysis and resolution of any problems that may be encountered with the operational environment.
8. A ClearCase version upgrade may become available during this implementation and it may become advantageous to change this plan so that the upgrade is incorporated.
9. Ongoing system administration activities may adversely impact this plan.
10. Firewall ports for ClearCase licenses will probably have to be opened.
11. There may be unknown network elements (firewalls, switches, routers, policy, etc) that could adversely affect this plan. Detailed network topology diagrams are not available.
12. ClearCase will not be installed on production hosts.
13. CM and ClearCase process and procedure development and implementation is critical to effective use of ClearCase.
14. Appropriate training and experience is critical to effective use of ClearCase.
15. User account management process and procedures documents are not available.
16. ITA environment management process and procedures documents are not available.
17. Required user and group names are unknown.
18. Users migrating from the ACDOE ClearCase environment will have a less robust ClearCase client interface (ClearCase Web) on ACDOE desktops. However, the desktop ClearCase web interface will be fully integrated with a full ClearCase interface on VDC hosts.
19. Undocumented VDC and FSA security requirements are a risk to this plan.
20. Using ClearCase Web to extend ClearCase to the EDNet and ACDOE desktops provides limited ClearCase functionality on those desktops. Full ClearCase functionality could be provided with MultiSited ClearCase server and clients in each of the LANs. The MultiSite option was not selected due to resource and schedule cost to implement and maintain.

21. All EDNet and ACDOE desktops are presumed to be NT or W2K. Other OS have not been tested and are not supported.

8.1 Required ITA Support

1. Assist identifying and evaluating ClearCase hosts -

Appendix D identifies about 20 potential hosts. ITA support is required to verify that the correct hosts are identified. Some ITA admin support may be required to evaluate that the existing H/W, OS, and layered products conform with ClearCase standards. Some ITA support to review how the NT hosts are used and determine if installing ClearCase will provide value to development and test efforts.

2. Review the existing VOB and View server availability issues -

These existing servers (16 and 17) “belong” to EAI. ClearCase VOB and view servers need to be available to all FSA ClearCase users. ITA support reviewing the existing user requirements for these servers and if needed, implementing alternate servers as ITA hosts.

3. Support implementing an operational ClearCase web server –

We currently have a ClearCase prototype Web server installed and functional on e2. ITA Web server administration support for implementing an operational ClearCase web server will be required.

4. Provide background on ITA tool admin support use -

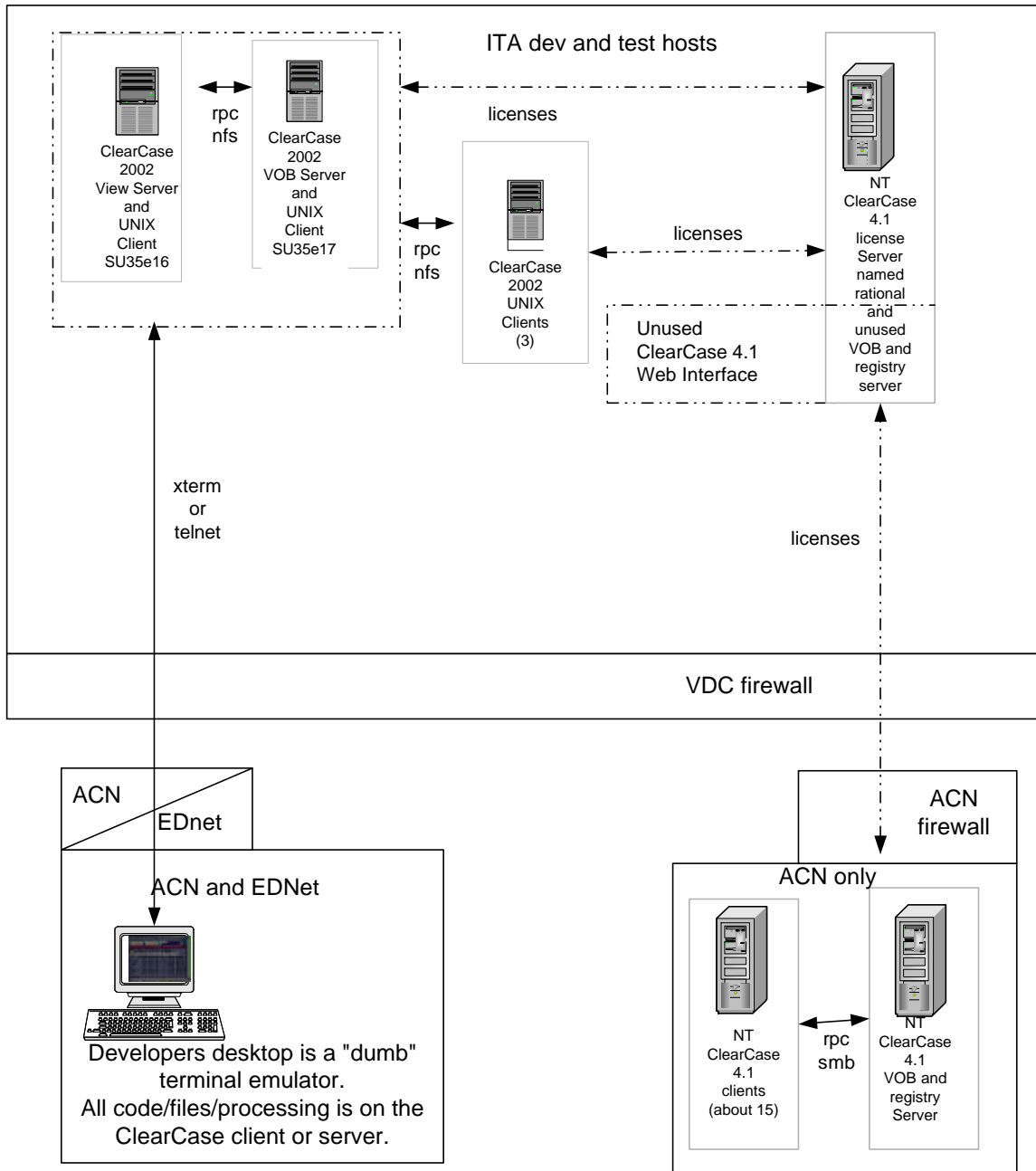
ITA tool admins will provide some background on how the various ITA tools such as Informatica, Autonomy are used for development, test, and production to help determine how best to integrate ClearCase with them, validate the complete list of tools on identified in Appendix D, and general tool support.

5. Environment Management -

ITA support to provide background on any existing environment management plans for the proposed hosts, documentation that details the existing, or planned partitioning of these hosts. Identifying specific development and test partitions for each project is critical to developing detailed project CM and test procedures that enable version control and valid test environments.

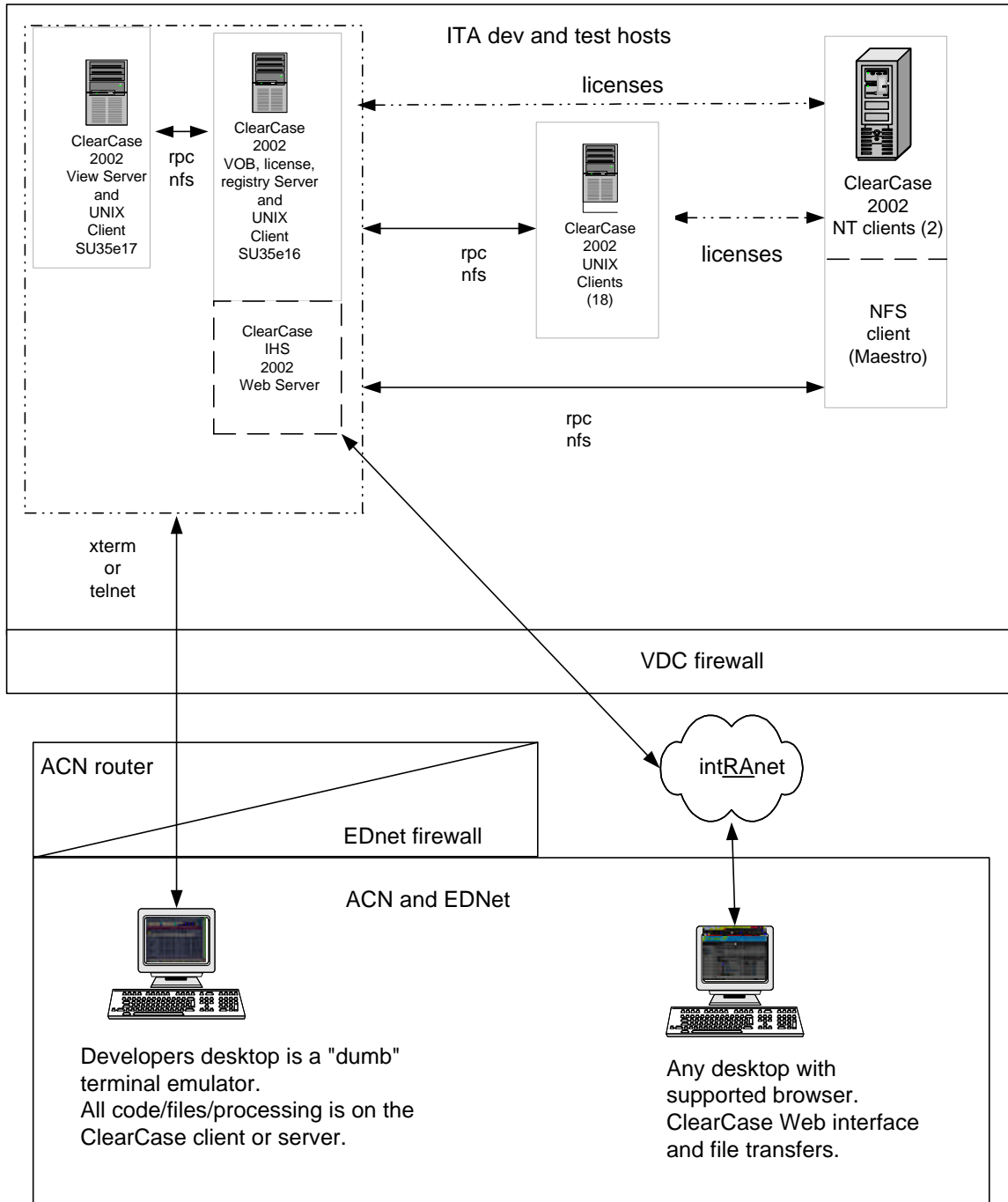
APPENDIX A, Existing ClearCase Diagram

ClearCase
Diagram
as of
01/31/03



APPENDIX B, Proposed ClearCase diagram

ClearCase
Diagram
Proposed



For most development work, the developers will either telnet from their EDNet or Accenture hosted NT workstations into their respective ITA UNIX host (and ClearCase

client) and thus have ClearCase command line access or will use the ClearCase Web interface from a browser on their EDNet or Accenture hosted NT workstations. A few of the more complex ClearCase activities are best accomplished with the ClearCase UNIX GUI. Access to the ClearCase UNIX GUI from Accenture (and possibly EDNet) hosted NT workstations is gained through xterm session instead of telnet or web browser sessions.

APPENDIX C, Account Management Draft

UNIX and NT Account creation procedure for ClearCase as an ITA service INITIAL DRAFT

SCOPE and INTRODUCTION

This procedure is written to document the specific steps (in addition to the existing FSA/VDC account request process) that must be followed to create and maintain UNIX and NT accounts for Clear Case as an ITA service. This procedure is required because the version control tool, ClearCase, will be used to support development, test, and deployment efforts on all ITA (and potentially on some non-ITA) development and test hosts at the VDC. A major benefit of using ClearCase is that project members can have dynamic access to the project's artifact (file) repository from any of the project's ITA hosts. In fact, the version controlled artifacts (files) appear as native file system elements to users as well as other applications, services, executables, etc.

This type of dynamic, "virtual native", version controlled, file access across distributed hosts places a premium on ensuring that user accounts (the artifact owners) are consistent across the hosts that provide shared access to the artifacts (files). ClearCase specific user accounts are not created. Instead, ClearCase uses the native system (NT or UNIX) user accounts and the native file access and permission controls.

Regardless of whether they use ClearCase or not, developers using the ITA hosts will need UNIX and/or NT accounts and groups on each of their ITA/VDC, UNIX and NT hosts to perform their normal development activities. However, to provide the developers with the benefits of ClearCase, these accounts must be consistent across the hosts.

This account consistency has been successfully implemented at the VDC for the existing UNIX ClearCase implementation. The existing ClearCase environment is currently providing reliable ClearCase operations. RTS is planning to extend the existing ClearCase environment to all/most ITA (and potentially on some non-ITA) development and test hosts at the VDC.

DEFINITION OF CONSISTENT ACCOUNTS -

1. For all ClearCase users, UNIX account and group names and UIDs and GIDs must be consistent across the ClearCase hosts at the VDC.
2. For all ClearCase users, NT account and group names (not UIDs and GIDs) at the VDC must be domain accounts and must be consistent within the domain as well as across the VDC NIS map.

ACCOUNT MANAGEMENT PROCESS

Coordinating the activities of the admins that create and manage the accounts is critical to achieving this consistency. This document is limited to defining the procedures the project teams and VDC account admins must follow IN ADDITION to existing FSA/VDC account request process. This document will describe how the additional procedures interface with the exiting FSA/VDC process. These additional procedures do not alter or change the user account request process for FSA. The procedures are not overly complex or technical. However, creating procedures that successfully coordinate the activities of the many admins and managers to work as one team and produce the desired results in a timely manner will present communication and teamwork challenges.

Please note that these activities will NOT have any impact on the existing hosts named rational and sfant018.

Existing Accounts –

In Q3 '02, the VDC adopted an internal process for ensuring that new UNIX accounts are created in a consistent manner. However, most existing accounts were created prior to that process and may or may not be consistent across hosts. Existing users often have different account names and IDs across hosts.

There are two basic approaches for addressing existing UNIX user accounts. One would be to give an existing user a new consistent account (and group) and have each user change ownership and group membership of existing files that she owns. The other approach would be to have the VDC admins select an existing account name (and groups) for each user to be the user's consistent account and change ownership and group membership of existing files for that user to the consistent account and group. In either case, some "breakage" should be expected and will be repaired case by case.

In addition to UNIX account management, NT accounts must also be consistent as described above.

HIGH-LEVEL CLEARCASE ACCOUNT PROCEDURE

The following procedure can be used with the existing FSA account request process to help manage accounts. Currently, a user submits a written account request form to FSA , usually one per host, for an account or group creation or modification. The form eventually arrives at the VDC admin responsible for the host to create the account. This process could possibly be enhanced to better facilitate account/group consistency across hosts. Consider rendering the existing FSA account management forms as ClearQuest change requests. This would allow for automated document and process flow.

1. Each project (CM/ClearCase admin) is responsible for submitting and tracking FSA VDC account creation/modification requests for project member ClearCase users and administrators. To ensure the required user account consistency, specific

- text should be included on the account request form. See Appendices A and B for sample text.
2. Each project (CM/ClearCase admin) is responsible for knowing and following the FSA VDC account creation/modification process.
 3. Each project CM/ClearCase admin maintains a list (spreadsheet) of the project's users and account information and request status. See Appendix C sample spreadsheet.
 4. The VDC internal processes maintain a table for mapping a user to at least one account name and many group names for the VDC account creation process across both the Windows and UNIX domains.
 5. The VDC internal processes will support converting existing file ownership and group permissions to new accounts.
 6. The VDC will maintain and publish a contemporaneous account status report. This report will provide status for each account/group creation, modification, or deletion request.

Sample Request for ClearCase User

The sample below must be modified with project specific values.



DEPARTMENT OF EDUCATION
STUDENT FINANCIAL ASSISTANCE (SFA)
User ID Request Form
This Document Contains Privacy Act Information

A. USER INFORMATION	<input type="checkbox"/> ED employee	<input checked="" type="checkbox"/> Contractor (List Company Name) <u>Accenture</u>
----------------------------	--------------------------------------	--

Name: _____ ☒ New User
 Last Four Digits of SSN: _____ ☐ Delete User
 Current User ID (if any) _____ ☐ Change/ Expand
 Access
 Phone: 202-962-0756 _____ ☐ Renew Access
 Short Description of Task (**REQUIRED**): <use TO number here>
System Security Officer or Alternate to be notified when access is completed. (SFA SSO):

Name _____ Email address _____ Telephone (_____
 Alternate (SSO): Name: _____ Email Address: _____
 Telephone _____

B. TYPE OF ACCESS REQUIRED		Must Include Exact Information from Matrix To Match Headings or cut and paste directly from the matrix				
VDC Application	SFA Application	VDC System Name	Prod Level	Access type	System Type	
Comments Manager _____ User/Developer/DBA _____ Ex. Group name) _____						
Mid-Range Manager	Application	System Name	Prod Level	Access Needs	System Type	Group Name

Additional Comments:

Please coordinate with <project CM admin name, email, phone> and Becky Panetta (rpanetta@csc.com 678-376-9332 ClearCase admin for the VDC) on the exact UID and GID. I am requesting multiple accounts on multiple systems and it is imperative that all account and group names and UIDs and GIDs are consistent across hosts.

Required Group Name: <project group name>

Required UserID: <account name> with required UID of ### [if the account and UID already exist on another host]

Please create the group, <project group name> on all of the above hosts with same GID on all of the above UNIX hosts. The group name, <group name> is lower case. Note

that on the above NT host the UID/GID does not matter but the name must be all lowercase.

Please create the account, <account name> on all of the above hosts with same UID on all of the above UNIX hosts. The account name, <account name> is lower case. Note that on the above NT host the UID/GID does not matter but the name must be all lowercase.

System Security Access Controls require a clearance at one of the listed risk levels to be met. The applicant has submitted all required forms to SFA Personnel Security for clearance at this level.

Check One (SSO is Required to Select)

_____ Low Risk, **1C** (SF-85, OF-306, Fingerprints)

_____ Moderate Risk, **5C** (SF-85P, OF-306, Credit Release, Fingerprints)

_____ High Risk, **6C** (SF-85P, OF-306, Credit Release, 85P-S, Fingerprints)

1. Applicant: _____ Date: _____
Print Name *Signature*

2. Applicant Supervisor: _____
_____ Date _____
Print Name *Signature*

3. SSO, ED Project Mgr, or COTR: _____
Date _____
Print Name *Signature*

C. SFA Personnel Security Office Use Only

Approval JOEL CLARK Rm 22B2 _____

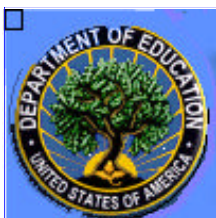
Date: _____ *Print Name* *Signature*

Current Security Status: ☐ In Progress ☐ Level _____

Date Security Packet Forwarded to SFA HR: _____

Sample Request for ClearCase Administrator

Each project team has a dedicated project repository known as a VOB. Each project has a VOB administrator who will use a dedicated VOB administration account when performing VOB administration. The project VOB administrator will own the project VOB administration account. The template below is to be used for requesting the VOB administration account. This account is needed early in the process because the project's VOB must be created with this account. Also, even though this account is NOT a generic account, the account creation approvers and administrators often interpret these requests as requests for generic accounts. To enhance security, generic accounts are not allowed. The text provided below explains that the account is NOT generic and is acceptable per Jim Cunningham. The sample below must be modified with project specific values.



DEPARTMENT OF EDUCATION
STUDENT FINANCIAL ASSISTANCE (SFA)

User ID Request Form

This Document Contains Privacy Act Information

A. USER INFORMATION	<input type="checkbox"/> ED employee	<input checked="" type="checkbox"/> Contractor (List Company Name) <u>Accenture</u>
---------------------	--------------------------------------	--

Name: John Administrator ☒ New User
 Last Four Digits of SSN: 1234 ☐ Delete User
 Current User ID (if any) ☐ Change/ Expand
 Access ☐ Renew Access
 Phone: 202-962-XXXX

Short Description of Task (REQUIRED): TO 94 NSLDS II Reengineering
System Security Officer or Alternate to be notified when access is completed. (SFA SSO):

Name Robert Clayton Email address robert.clayton@ed.gov Telephone (202) 377-3561

Alternate (SSO): Name: _____ Email Address: _____
 Telephone _____

B. TYPE OF ACCESS REQUIRED	Must Include Exact Information from Matrix To Match Headings or cut and paste directly from the matrix
----------------------------	---

VDC Application SFA Application VDC System Name Prod Level Access type System Type

Comments

Manager

User/Developer/DBA Ex. Group name)

Mid-Range Manager	Application	System Name	Prod Level	Access Needs	System Type	Group Name
Noniewicz, Paul	EAI Bus	su35e16	Dev	Developer and DBA	SUN	clearcase
Noniewicz, Paul	EAI Bus	su35e17	dev	Developer and DBA	Sun	clearcase

Additional Comments:

Please coordinate with Christopher DeBernard(c.p.debernard@accenture 703-947-3974 ClearCase admin for NSLDS II) and Becky Panetta (rpanetta@csc.com 678-376-9332 ClearCase admin for the VDC) on the exact UID and GID. I am requesting multiple accounts on multiple systems and it is imperative that all account and group names and UIDs and GIDs are consistent across hosts.

Required Group Name: clearcase

Please also add nsvobadm to the nslddev group.

Please create the group, nslddev, with same GID on all of the above UNIX hosts if it does not exist already. The group name, nslddev is lower case.

Required UserID: **nsvobadm** with required UID of XXXX (As long as it is the same across all hosts.)

Please create the account, **nsvobadm** on all of the above hosts with same UID on all of the above UNIX hosts. The account name, **nsvobadm** is lower case.

NOTE: This will be my (**John Administrator**) second ID. The **nsvobadm** account is required to centralize the administration authorities of our ClearCase implementation in the event that the current administrator (**John Administrator**) was to leave the project. The **nsvobadm** account will only exist on su35e16 and su35e17.

System Security Access Controls require a clearance at one of the listed risk levels to be met. The applicant has submitted all required forms to SFA Personnel Security for clearance at this level.

Check One (SSO is Required to Select)

_____ Low Risk, **1C** (SF-85, OF-306, Fingerprints)

_____ Moderate Risk, **5C** (SF-85P, OF-306, Credit Release, Fingerprints)

_____ High Risk, **6C** (SF-85P, OF-306, Credit Release, 85P-S, Fingerprints)

1. Applicant: _____

_____ Date _____

Print Name

Signature

2. Applicant Supervisor: _____

_____ Date _____

Print Name

Signature

3. SSO, ED Project Mgr, or COTR: _____

Date _____

Print Name

Signature

C. SFA Personnel Security Office Use Only

Approval JOEL CLARK Rm 22B2 _____

Date: _____ *Print Name*

Signature

Current Security Status: ☐ In Progress ☐ Level _____

Date Security Packet Forwarded to SFA HR: _____

TO: Robert Clayton
FROM: John Administrator
DATE: Current Date
SUBJECT: NSLDS II ClearCase Admin User Account

The NSLDS II team is submitting a request to obtain the user account, **nsvobadm**, on su35e16 and su35e17. It will be obtained under John Administrator's name. He/She will be the only person that will know the password and use the account.

John Administrator is the ClearCase Administrator for the NSLDS II Project. He is part of the Accenture team working on NSLDS II. He/She is in the pipeline to obtain 6C clearance.

This account is necessary in order to configure the ClearCase environment for NSLDS II so that it will continue to function if the ClearCase administrator were to leave the project. In that event, the account would be destroyed and recreated for the new ClearCase administrator.

In ClearCase, the user that creates an object owns it. It is very difficult to transition ownership of an object once it is created and mature. The ClearCase best practices dictate that we create our code repository in this manner.

Jim Cunningham directed me to alert you to this account request.

Thank you,

John Administrator

Sample Account Management Table

HostName	UserName	AccountName	Status	Groups	Comments
SU35E1					
SU35E2					
SU35E4					
SU35E5					
su35e16					
su35e17					
SFANT001					
SFANT006					
su22e1					
su22e2					
su35e6					
su35e11					
HPN13					
HPN14					
HPN15					
HPN16					

APPENDIX D, ITA Hosts and Tools

This section provides a table of known ITA hosts and tools and the existing ClearCase status for each host.

ClearCase status	Machine	Logical Name	Products
Installed	SU35E1	Content Management	TeamSite OD DD 5.0.1 OpenDeploy Client 4.2.1 DataDeploy 4.2.1 Apache Web Server TeamSite 5.0.1 OpenDeploy 5.0 DataDeploy 5.0
Installed	SU35E2	Application Server	Autonomy Knowledge Server 2.1 Autonomy Knowledge Update 2.1 Autonomy Knowledge Fetch 2.1 Autonomy Knowledge Builder 2.1 I.H.S.1.3.12 & 1.3.6 WebSphere Advanced Edition 3.0.2 JDK 1.1.2 & 1.2.2 Servlet API SDK 2.2 OpenDeploy Server 5.0
Proposed	SU35E4	Content Management	TeamSite 4.2.1 OpenDeploy Client 4.2.1 DataDeploy 4.2.1 Apache Web Server
Installed	SU35E5	Informatica Server	Informatica PowerCenter e 1.7 WebSphere Advanced Edition 3.5 OpenDeploy 5.0
Installed	su35e16	MQSeries Run1	MQ Series Messaging 5.1 DB2 UDB Enterprise Edition 6.1 MQ Series Integrator 2.0.1
Installed	su35e17	MQSeries Run2	MQ Series Messaging 5.1 DB2 UDB Enterprise Edition 6.1 MQ Series Integrator 2.0.1

ClearCase status	Machine	Logical Name	Products
Review	HPV1	Development Database Server	Oracle 8.1.6 & 8.1.7; SIDs installed - WAS35D, WAS35TST, WAS35STG, WAS35HP, WAS35ST2, CBSDEV, CBSTST, CBSSTG, FAFSADEV, SESSDEV, FAFSATST, SESSTST, FAFSASTG, SESSSTG, FAFSAST2, SESSST2, VICDEV, DLMDEV, DLMTST, VICTST, VICSTG, IFAPD, IFAPT, IFAPS
Review	SFANT001	MicroStrategy (Primary)	MicroStrategy Web Server 7.0 MicroStrategy Intelligence Server 7.0 MS Data Access Components 2.1 sp2 MS IIS
Review	SFANT006	EAI Development Server	MQ Series Messaging 5.1 plus CSD 4 MQ Series Integrator 2.01 Universal DB2 Database 6.1 MQ Series Workflow 3.2.1
Proposed	su22e1	Performance Server	IBM Network Dispatcher 3.6
Proposed	su22e2	Web Server	I.H.S 1.3.12
Proposed	su35e6	Web Server	I.H.S 1.3.12
Proposed	su35e11	Application Server	WebSphere Advanced Edition 3.5, Servlet API, Shadow Direct
Proposed	HPN13	Web Server	I.H.S 1.3.12
Proposed	HPN14	Web Server	I.H.S 1.3.12
Proposed	HPN15	Application Server	WebSphere Advanced Edition 3.5, Servlet API, Shadow Direct
Proposed	HPN16	Application Server	WebSphere Advanced Edition 3.5, Servlet API, Shadow Direct
Review	HPV1	Development Database Server	Oracle 8.1.6 & 8.1.7; SIDs installed - FAFSASTG, CBSSTG, SESSSTG, WASPRFHP, WAS35ST2

APPENDIX E, ClearCase Install List

This section provides a sample ClearCase client installation checklist

1. Request and create admin accounts
2. Open GCARS for each platform release area (2 - 3)
3. Check disk space for release area
4. Install each platform release area
5. Confirm release area export
6. Add mounts from su35e16 &17
7. Check kernel parm 128 Unix Processes
8. Check kernel parm 600 file descriptors
9. Check OS patch level
10. Add needed patches
11. Check layered software packages Install if not available
12. Check for disk space for client install
13. Add license server to /etc/hosts
14. Open GCARS for install on each host
15. Verify the client install

APPENDIX F, ClearCase Training

ClearCase Training Background –

First, notice the distinction between CM and ClearCase training. It is highly unlikely that a freshly trained, ClearCase admin, lacking any significant CM and development experience will successfully lead a software development project team to embrace and adhere to sound configuration management practices during the intense pressures of the typical project life cycle. This is especially true given the paradigm shift and relatively steep learning curve of CM process and procedures for concurrent parallel development with ClearCase. It is also unlikely that any ClearCase implementation will be effective without adequate user training, even with a highly experienced CM and ClearCase admin.

However, with adequate user training, a reliable and consistent version control environment, and expert and timely support, development teams do embrace and adhere to these sound practices, and efficiency dramatically improves. Once this becomes routine, less experienced admins can successfully support project teams, especially with a standardized and consolidated architecture as proposed in this plan. In addition, once concurrent parallel development becomes “institutionalized”, the amount of user training for new users can be scaled back.

When implementing concurrent parallel development with ClearCase for a project that has little or no experience with the paradigm, 16 class/lab hours of ClearCase user training typically the minimum. ClearCase admin training requires another 24 hours of class/lab. Note that after this training the users and admins are still just “beginners” and will require desk side support and mentoring from an experienced ClearCase administrator and/or CM practitioner. Eventually, adherence to sound software engineering practices and the resulting significant improvements in efficiency, will become part of the organizational culture. Realizing this type of cultural change will require clear directive, expectations, and incentives from FSA management.

In general, all of this training time will have been recouped by the end of the project’s first integration phase. The return on this training investment will continue beyond the development project and beyond the full operational life of the system. More return on this investment will be realized when at least some of the trained team members roll to new projects.

Developing in house ClearCase admin capability may not provide significant advantages to hiring/contracting for these services. Though, developing some level of in-house ClearCase admin capability to ensure consistency may be advantageous.

APPENDIX G, Project Management Plan



CCasITAarchPlannin
g.mpp